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Forest Service

Medicine Bow – Routt National Forests & Thunder Basin National Grassland

Laramie, Wyoming

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Transportation Report

Landscape Vegetation Analysis (LaVA)

Medicine Bow National Forest

Albany and Carbon Counties, Wyoming

/s/Suzanne E. Layne **04/13/2018**

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Table of Contents

List of Tables

List of Figures

Example: **Figure 1: Structural Stages by Management Area**

SUMMARY (HEADING 1)

REGULATORY FRAMEWORK (HEADING 1)

The forest roads are subject to a system of laws, regulations and technical directives.

Authority:

These two laws provide the basic authorities for the roads discussed.

The National Forest Roads and Trails Act of October 13, 1964, as amended (16 U.S.C. 522-538) authorizes road and trail systems for the National Forests. The act authorizes construction and financing of roads including obligation of requirements on road users for maintaining and reconstructing roads including cooperative deposits for that work.

The National Forest Management Act of 1976 (U.S.C. 1608) directs that roads be designed to standards appropriate for their intended uses and requires revegetation of temporary roads authorized under a contract, permit, lease, or other written authorization within 10 years of termination of the written authorization.

Regulations:

The following sections of the Code of Federal Regulations apply to roads for the purpose of this report.

Sale and Disposal of National Forest System Timber (36 CFR Part 223. These regulations govern road construction related to Forest Service timber sale appraisals and contracts.

Travel Management (36 CRF Part 212, Subparts A, B, and C). Subpart A of these regulations establishes requirements for administration of the Forest transportation system, including roads, trails, and airfields, and contains provisions for acquisition of rights-of-way. Subpart A also requires identification of the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of NFS lands and use of a science-based roads analysis at the appropriate scale in determining the minimum road system. Subpart B describes the requir4ements for designating roads, trails, and areas for motor vehicle use map (MVUM). Subpart C describes the requirement for designating roads, trails, and areas for over-snow vehicle (OSV) use and for identifying designated roads, trails, and areas on an OSV use map.

Federal Laws and Regulations

- Manual on Uniform Traffic Control Devices for Streets and Highways, Federal Highway Administration, 23 Code of Federal Regulations (CFR) Part 655, Subpart F.
- Highway Safety Act of 1966, 23 USC Chapter 4.

State Laws and Regulations

Body text

Forest Service Direction

- Forest Service Handbook 7700 Travel Management, Chapter 10 Travel Planning, Amendment 2016-2
- Forest Service Handbooks 7709.55 – Travel Planning Handbook; 7709.56 – Road Preconstruction Handbook; 7709.56b – Transportation Structures Handbook; 7709.58 – Transportation System Maintenance Handbook; 7709.59 – Transportation System Operations Handbook

Forest Plan Direction

Management Area 1.31 - Backcountry Recreation, Year-round Non-motorized. Prohibit motorized uses.

Management Area 2.1 – Special Interest Areas. Construct new roads only when consistent with special interest area values, such as interpretation or education.

Management Area 2.2 – Research Natural Areas. Limit all motorized use, including snowmobiles, to administrative, law enforcement, search and rescue, emergency, and scientific purposes.

Management Area 3.56 – Aspen Maintenance and Enhancement. Roads will range from native surface to those with maintained, gravel surfaces. Some of these roads will remain open; others will be closed seasonally or permanently.

Management Area 5.13 – Forest Products. Motorized and non-motorized recreation opportunities will be provided. An extensive road and trail system will exist, ranging from primitive roads to maintained gravel roads. Some roads will be closed seasonally; others will be closed after timber removal is complete. Secondary roads will be constructed to a lower standard sufficient for logging trucks and passenger vehicles.

Management Area 5.15 – Forest Products, Ecological Maintenance and Restoration Considering the Historic Range of Variability. Numerous open and closed roads provide commercial access, and both motorized and non-motorized recreational opportunities. A relatively high level of disturbance is accepted, in areas of lesser wildlife habitat value (HRV). Use of temporary roads for management activities is preferred. Effective decommissioning of temporary roads following project implementation is a priority.

Management Area 5.41 - Deer and Elk Winter Range. Road systems and trails will be relatively undeveloped. Motorized traffic will be prohibited during the winter and spring.

Road activities would follow design guidelines and Best Management Practice guidelines, see Appendix A and B.

A. FOREST PLAN: GOALS, STANDARDS, AND GUIDELINES.

The following table illustrates the opportunities, within the Project area, to meet or move towards the Forest Plan Goals, Standards and Guidelines:

TABLE 2: PROJECT RELATED FOREST PLAN GOALS, STANDARDS, AND GUIDELINES:

Forest Plan Management Areas	Forest Plan Goals, Standards and Guidelines
3.58 – Crucial Deer and Elk Winter Range - Transportation	Standards 1. Restrict motorized use to designated routes as identified in Geographic Area direction from November 15 – April 30. Guidelines 1. Close roads, as needed, to prevent disturbance during fawning/calving periods. Guidelines 2. Avoid constructing new roads through important forage, cover, and fawning/calving areas.
5.15 Forest Products - Transportation	Guidelines 1. Close non-essential roads to enhance or develop large areas for wildlife security and non-motorized recreation opportunities. Guidelines 2. Use coordinated landscape scale

	treatment to limit the need for frequent reentries and continued need for additional classified roads. Maximize use of temporary roads.

ANALYSIS METHODOLOGY (HEADING 1)

Describe sources of information used to support your analysis. If applicable, discuss models and briefly describe assumptions used and any limitations. Describe issues relevant to your resource and discuss the analysis indicators to be measured and any background info supporting why those are the indicators chosen. Supporting background info may include documentation of field trips and fieldwork, consultation and information sharing with individuals, organizations, and agencies.

ENVIRONMENTAL CONSEQUENCES (HEADING 1)

Project Design Features (Heading 2) _____

Design Criteria

Transportation improvements are expected to begin during the 2019 construction season.

The following recommendations should be considered during project implementation:

1. Road closure devices, including gates, barriers, slash or other devices needed to prohibit or eliminate use, would be located on the ground to provide the most effective means of accomplishing the desired travel management strategy.

2. Physical closures, such as slash, stumps, rocks and revegetation are to be used to eliminate use. Earthen barriers may be used when there is not adequate material available for slash, stumps or rock closures. Closure gates may be utilized where administrative access is needed.

3. Whenever possible, roads shall be relocated or constructed out of draw bottoms to improve drainage and protect soil and water resources. Abandoned roadbeds shall be revegetated and returned to as natural a state as possible.

4. All temporary roads used to access treatment areas would be closed after administrative activity is completed.

5. Where sod has effectively stabilized existing roadbeds, efforts would be made to minimize disturbance to the sod layer during maintenance and reconstruction activities.

6. Unauthorized routes used for temporary access would be decommissioned.

7. Dust control, if necessary, may be done with water, magnesium chloride, calcium chloride, or equivalent.

8. Route verification would be held prior to road contract preparation, to show Forest and District Specialists the location and design of planned relocation, realignment and new construction to ensure the road would not have additional adverse effects on resources.

Mitigation Measures

Maintenance on all roads used for vegetation treatment operations would be the responsibility of the Contractor. Maintenance includes cleaning out silt from sediment collecting ponds and depositing it in upland locations, keeping silt fence upright and functioning by cleaning out any sediment collected in front of the silt fence and depositing it in upland locations, keeping all drainage structures clear and functional, eliminating erosion of cut and fill slope and roadway soils, maintaining vegetative buffers, encouraging revegetation, and blading road surfaces. Post use maintenance is required by the Contractor as part of the contract.

Monitoring Recommendations

Implementation monitoring of road maintenance, reconstruction and new construction activities would be accomplished through site inspections conducted by District personnel and certified Engineering personnel to ensure contract specifications and road designs are implemented as described in the road contract. Measured and visual monitoring would determine physical effects, success of natural and enhanced revegetation, and to ensure traffic safety and compliance with state and federal laws.

Alternative 1 - No Action - Direct and Indirect Effects

Under this alternative, there would be no direct effects to the existing transportation system from the Landscape Vegetation Analysis project. Scheduled annual and routine maintenance would continue as it has in the past.

The beneficial effects of taking no action are that there would be not be additional ground disturbing activities, no increased dust and noise, no tree removal, etc. as would occur with Alternative 2.

The adverse indirect effects of taking no action are that we would forego the opportunity to provide additional maintenance, reconstruction, and road closings associated with and funded by various federal programs.

Increased road maintenance needs can be expected under the no action alternative due to expected increase in water yield and peak flows.

Roads identified for closure with previous decisions may continue to see unauthorized travel until funding becomes available to effectively close the roads.

Clearing of hazardous trees along routes will occur under the no action alternative.

Alternative 2 - Proposed Action - Direct and Indirect Effects

The action alternative proposes maintenance and reconstruction activities. Direct adverse effects from these proposed activities are short term vegetation loss, vegetation removal, soil disturbance and

compaction, an increase of mixed traffic and traffic delays during project implementation. Short term increases of noise and dust would occur.

Recreational road and trail use may be temporarily affected by transportation needs associated with timber hauling, equipment access, and harvesting activities. Recreational users might not be able to use some of the roads and trails at times during implementation of the action alternative.

Direct and indirect beneficial effects include improvements to existing roads that would comply with Best Management Practices and road design criteria. Safety issues would be addressed in the road design. Existing roads located in meadows would be relocated and/or armored with aggregate material to prevent road indentation, rutting and sediment movement. Existing roads would be realigned and relocated to reduce grades if needed.

Once road improvements are completed, long term maintenance and deferred maintenance costs would decrease. As vegetation is reestablished, the effects on soil erosion would be reduced. The vegetation would aid in stabilizing the roadway and the cut and fill slopes. Positive driving experiences would improve from proper road design and repair of the travel way. The road use pattern in the area would change as unauthorized route, used as temporary roads, are closed and closure devices are secured.

Roads utilized under Alternative 2 would be maintained and reconstructed in accordance to the Best Management Practices and Engineering Design Guidelines (see Appendix A and B). Existing roads with soil and water problems would be designed using these guidelines. The direct and indirect effects of sediment contribution would diminish as these actions are taken.

.

CUMULATIVE EFFECTS

Alternative 2 would have an increase in traffic as compared to Alternative 1.

Road reconstruction activity may cause traffic delays, and may be closed to public motorized use during harvest periods.

There will be road reconstruction and maintenance projects where needed to manage the road system for public safety and resource management. The project work would include road surface replacement, road surface grading, roadside clearing of vegetation, culvert replacements, and maintenance to culverts, cattleguards, ditches, and other structures. It is possible that multiple projects will be in progress in the same area.

Table 1: Summary of existing road miles by maintenance level.

Maintenance Level	Road Length (miles)
1 – Basic custodial care (closed)	506
2 – High clearance vehicles	1,053
3 – Suitable for passenger cars	371
4 – Moderate degree of user comfort	220
5 – High degree of user comfort	≤0.5
Total NFS roads	2150.5

COMPLIANCE WITH REGULATORY DIRECTION (HEADING 1)

Describe whether and how the alternatives comply with state and federal regulatory direction. Include Forest Plan standards and guides if applicable. This can be done alternative by alternative or as one section comparing each alternative at the end of your report. Please work closely with your Forest counterpart when developing this section of the report.

REFERENCES

- Medicine Bow National Forest Revised Forest Land and Resource Management Plan. (2003 Revision) USDA Forest Service.
- Medicine Bow Forest Forest-wide Travel Analysis Report. USDA Forest Service.
- Roads Analysis Process (RAP) Report –Medicine Bow National Forest. USDA Forest Service.
- FS-643 Roads Analysis: Informing Decisions about Managing the National Forest Transportation System. August 1999. USDA Forest Service.
- Infrastructure (INFRA) Travel Routes Database.
- GIS Roads Layer.

APPENDIX

APPENDIX A – BEST MANAGEMENT PRACTICES

33 CFR 323.4(a)(6) [States that] Construction or maintenance of farm roads, forest roads, or temporary roads for moving mining equipment, where such roads are constructed and maintained in accordance with best management practices (BMPs) to assure that flow and circulation patterns and chemical and biological characteristics of waters of the United States are not impaired, that the reach of the waters of the United States is not reduced, and that any adverse effect on the aquatic environment will be otherwise minimized. These BMPs which must be applied to satisfy this provision shall include those detailed BMPs described in the state's approved program description pursuant to the requirements of 40 CFR 233.22(i), and shall also include the following baseline provisions: **(NOTE: Items in bold print are engineering design guidelines or standard operating procedures as related to each BMP.)**

(i) Permanent roads (for farming or forestry activities), temporary access roads (for mining, forestry, or farm purposes) and skid trails (for logging) in waters of the United States shall be held to the minimum feasible number, width, and total length consistent with the purpose of specific farming, silvicultural or mining operations, and local topographic and climatic conditions;

REDUCE STEEP (GREATER THAN 10%) GRADES WHERE POSSIBLE. CONSIDER SEASONAL OR ANNUAL ROAD AND AREA CLOSURES TO PROTECT ROADS. REFERENCE FSH 7709.56 ROAD PRECONSTRUCTION HANDBOOK FOR ALL DESIGN STANDARDS. ROAD MANAGEMENT OBJECTIVES, INCLUDING ROAD STANDARDS, MAINTENANCE LEVEL AND TRAVEL MANAGEMENT, ARE DOCUMENTED AND APPROVED FOR ALL ROADS. MINIMIZE NEW CONSTRUCTION. NEW ROADS ARE CONSTRUCTED TO THE MINIMUM STANDARD NECESSARY FOR THE TYPE OF USE IN ACCORDANCE WITH FSH 7709.56. NEW ROAD CONSTRUCTION IS CLOSED FOLLOWING TIMBER MANAGEMENT ACTIVITY UNLESS DOCUMENTED AND APPROVED ROAD MANAGEMENT OBJECTIVE STATES OTHERWISE.

(ii) All roads, temporary or permanent, shall be located sufficiently far from streams or other water bodies (except for portions of such roads which must cross water bodies) to minimize discharges of dredged or fill material into waters of the United States;

RELOCATE ROADS OUT OF BOTTOMS TO MINIMIZE IMPACT IN INTERMITTENT DRAWS. OUTLETS OF DRAINAGE DEVICES PROVIDE FOR DISPERSION OF WATER TO DISSIPATE FLOW. CATCHMENT BASINS ARE OF ADEQUATE SIZE AND LOCATION TO PREVENT SOIL MOVEMENT OFF THE SITE. MINIMIZE CROSSINGS OF PERENNIAL STREAMS. CONSULT WITH FOREST HYDROLOGIST AND FISHERIES BIOLOGIST TO DEVELOP THE PROPER STRUCTURE REQUIRED FOR THE STREAM CHARACTERISTICS, FLOW VOLUME, SOIL TYPE AND DRAINAGE AREA.

Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation. Maintain a vegetative buffer as identified by Vbfr Equation between streams and parallel roads sufficient enough to eliminate movement of soil to the stream. Catchment basins are

used where terrain permits. Fill slopes and other disturbed areas are revegetated. Road construction in non-wetland meadows is in accordance with the Forest Plan.

(iii) The road fill shall be bridged, culverted, or otherwise designed to prevent the restriction of expected flood flows;

DRAINAGE DEVICES ARE DESIGNED AND INSTALLED IN ACCORDANCE WITH 33CFR323.4(A)(6) AND APPLICABLE STATE BMPS AND GUIDELINES SET FORTH IN FSH 7709.56 ROAD PRECONSTRUCTION HANDBOOK AND FSH 7709.56B DRAINAGE STRUCTURES HANDBOOK. SURFACE DRAINAGE DEVICES INCLUDE CULVERTS, ROLLING DIPS AND WATER DIVERSION STRUCTURES. CULVERTS AND WATER DIVERSION STRUCTURES ARE GENERALLY CONSIDERED FOR USE ON GRADES STEEPER THAN 10%. CULVERT SIZE AND SPACING ARE IN ACCORDANCE WITH THE ABOVE MENTIONED HANDBOOKS. WATER DIVERSION STRUCTURES ARE SPACED FROM 150' TO 200' APART AS NEEDED ON CONTINUOUS GRADES. CULVERTS AND STREAM CROSSINGS WILL BE STABILIZED TO THE 100-YEAR EVENT. ROLLING DIPS ARE SPACED FROM 200' TO 500' APART, ON CONTINUOUS GRADES WITHOUT BREAKS, DEPENDING ON SOIL TYPE AND ROAD GRADE AND MAY BE PLATED WITH ROCKY MATERIAL TO PROTECT THE SOIL. OUTLETS OF DRAINAGE DEVICES PROVIDE FOR DISPERSION OF WATER TO DISSIPATE FLOW.

Catchment basins are of adequate size and location to prevent soil movement off the site. Subsurface drainage devices are in accordance with Handbook references. Aggregate surfaced roads shall be routinely maintained. Ditches that have revegetated may be bladed if they are not functioning as designed. Culverts and other drainage devices shall be cleaned of debris to ensure their function is maintained. Minimize crossings of perennial streams. Consult with Forest hydrologist and fisheries biologist to develop the proper structure required for the stream characteristics, flow volume, soil type and drainage area. Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation. Routinely maintain bridges and culverts to ensure unrestricted flow.

(iv) The fill shall be properly stabilized and maintained during and following construction to prevent erosion;

ROCKY FILLS AND GEOTEXTILES ARE USED IN MARSHY, WET AREAS WHEN AVOIDANCE IS NOT POSSIBLE. HIGHLY ERODABLE SOILS, STEEP GRADES AND FLAT AREAS MAY BE PROTECTED BY PLACEMENT OF AGGREGATE ON THE ROADBED. DEPTH OF AGGREGATE MAY VARY DEPENDING ON TYPE OF SOIL BUT 4" IS GENERALLY THE MINIMUM DEPTH APPLIED TO ENSURE PROPER BEARING STRENGTH AND SOIL PROTECTION. WHERE CROSSINGS OF INTERMITTENT DRAINAGES, DRAWS AND VALLEYS ARE PROPOSED, 1' TO 2' OF ROCKY MATERIAL OR CONCRETE CABLE MATS MAY BE USED TO PROTECT THE SOIL. CUT AND FILL SLOPES ARE SEEDED AS SOON AS POSSIBLE FOLLOWING COMPLETION OF ROAD TEMPLATE. NATURAL REVEGETATION ALSO OCCURS TO SUPPLEMENT SPECIFIED SEEDING.

Aggregate surfaced roads shall be routinely maintained. Ditches that have revegetated may be bladed if they are not functioning as designed. Culverts and other drainage devices shall be cleaned of debris to ensure their function is maintained. Ensure fill slope protection with riprap, gabions, prompt seeding of slopes and/or other methods approved by the hydrologist, fisheries biologist and soil scientist. Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation.

Immediately repair damaged or eroded fill slopes.

(v) Discharges of dredged or fill material into waters of the United States to construct a road fill shall be made in a manner that minimizes the encroachment of trucks, tractors, bulldozers, or other heavy equipment within waters of the United States (including adjacent wetlands) that lie outside the lateral boundaries of the fill itself;

PLACEMENT OF THE STRUCTURE SHALL BE IN ACCORDANCE WITH STATE AND FEDERAL LAWS REGARDING CONSTRUCTION IN AND NEAR WATERWAYS, INCLUDING PLACEMENT OF FILL AND MEASURES TO CONTROL SEDIMENTATION. MAINTAIN A VEGETATIVE BUFFER AS IDENTIFIED BY VBFR EQUATION BETWEEN STREAMS AND PARALLEL ROADS SUFFICIENT ENOUGH TO ELIMINATE MOVEMENT OF SOIL TO THE STREAM. CATCHMENT BASINS ARE USED WHERE TERRAIN PERMITS. FILL SLOPES AND OTHER DISTURBED AREAS ARE REVEGETATED. CONSTRUCTION EQUIPMENT WILL NOT OPERATE IN VEGETATIVE BUFFER EXCEPT AS NECESSARY TO CONSTRUCT FILLS. PROPERLY PERMITTED (BY CORPS OF ENGINEERS) DISCHARGE OF FILL OR DREDGED MATERIAL INTO WATERS OF THE UNITED STATES WILL BE PERFORMED WITH MINIMAL ENCROACHMENT OF CONSTRUCTION EQUIPMENT OUTSIDE THE FILL ITSELF. MINIMIZE DISTURBANCE OF VEGETATION IN WATERS OF THE UNITED STATES DURING CONSTRUCTION AND MAINTENANCE OF ROADS.

(vi) In designing, constructing, and maintaining roads, vegetative disturbance in the waters of the United States shall be kept to a minimum;

CUT AND FILL SLOPES ARE SEEDED AS SOON AS POSSIBLE FOLLOWING COMPLETION OF ROAD TEMPLATE. NATURAL REVEGETATION ALSO OCCURS TO SUPPLEMENT SPECIFIED SEEDING. AGGREGATE SURFACED ROADS SHALL BE ROUTINELY MAINTAINED. DITCHES THAT HAVE REVEGETATED MAY BE BLADED IF THEY ARE NOT FUNCTIONING AS DESIGNED. CULVERTS AND OTHER DRAINAGE DEVICES SHALL BE CLEANED OF DEBRIS TO ENSURE THEIR FUNCTION IS MAINTAINED. MINIMIZE CROSSINGS OF PERENNIAL STREAMS. CONSULT WITH FOREST HYDROLOGIST AND FISHERIES BIOLOGIST TO DEVELOP THE PROPER STRUCTURE REQUIRED FOR THE STREAM CHARACTERISTICS, FLOW VOLUME, SOIL TYPE AND DRAINAGE AREA. PLACEMENT OF THE STRUCTURE SHALL BE IN ACCORDANCE WITH STATE AND FEDERAL LAWS REGARDING CONSTRUCTION IN AND NEAR WATERWAYS, INCLUDING PLACEMENT OF FILL AND MEASURES TO CONTROL SEDIMENTATION. ROUTINELY MAINTAIN BRIDGES AND CULVERTS TO ENSURE UNRESTRICTED FLOW. CONSTRUCTION EQUIPMENT WILL NOT OPERATE IN VEGETATIVE BUFFER EXCEPT AS NECESSARY TO CONSTRUCT FILLS.

Minimize disturbance of vegetation in waters of the United States during construction and maintenance of roads.

(vii) The design, construction and maintenance of the road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body;

PLACEMENT OF THE STRUCTURE SHALL BE IN ACCORDANCE WITH STATE AND FEDERAL LAWS REGARDING CONSTRUCTION IN AND NEAR WATERWAYS, INCLUDING PLACEMENT OF FILL AND MEASURES TO CONTROL SEDIMENTATION.

(viii) Borrow material shall be taken from upland sources whenever feasible;

BORROW MATERIAL NEEDED FOR ROAD CONSTRUCTION WILL BE TAKEN FROM UPLAND AREAS. ALSO, DISCHARGE OF WASTE MATERIAL FROM MAINTENANCE OF DRAINAGE STRUCTURES SHALL BE PLACED AT UPLAND SITES.

(ix) The discharge shall not take, or jeopardize the continued existence of, a threatened or endangered species as defined under the Endangered Species Act, or adversely modify or destroy the critical habitat of such species;

THE PRESENCE OF THREATENED AND ENDANGERED SPECIES AND THEIR HABITAT IS IDENTIFIED IN PROJECT AREA ANALYSIS. SEASONAL AND/OR ANNUAL ROAD CLOSURES FOR WILDLIFE CONSIDERATIONS ARE IDENTIFIED IN TRAVEL MANAGEMENT DOCUMENTATION.

(x) Discharges into breeding and nesting areas for migratory waterfowl, spawning areas, and wetlands shall be avoided if practical alternatives exist;

MARSHY, WET AREAS ARE AVOIDED WHERE POSSIBLE. ROCKY FILLS AND GEOTEXTILES ARE USED IN MARSHY, WET AREAS WHEN AVOIDANCE IS NOT POSSIBLE. PLACEMENT OF THE STRUCTURE SHALL BE IN ACCORDANCE WITH STATE AND FEDERAL LAWS REGARDING CONSTRUCTION IN AND NEAR WATERWAYS, INCLUDING PLACEMENT OF FILL AND MEASURES TO CONTROL SEDIMENTATION. IMMEDIATELY REPAIR DAMAGED OR ERODED FILL SLOPES. MAINTAIN A VEGETATIVE BUFFER AS IDENTIFIED BY VBFR EQUATION BETWEEN STREAMS AND PARALLEL ROADS SUFFICIENT ENOUGH TO ELIMINATE MOVEMENT OF SOIL TO THE STREAM. CATCHMENT BASINS ARE USED WHERE TERRAIN PERMITS. FILL SLOPES AND OTHER DISTURBED AREAS ARE REVEGETATED. ROAD CONSTRUCTION IN NON- WETLAND MEADOWS IS IN ACCORDANCE WITH THE FOREST PLAN.

(xi) The discharge shall not be located in the proximity of a public water supply intake;

SPECIFIC MITIGATION MEASURES WOULD APPLY TO MUNICIPAL WATERSHEDS IF UTILIZED.

(xii) The discharge shall not occur in areas of concentrated shellfish production;

(xiii) The discharge shall not occur in a component of the National Wild and Scenic River System;

(xiv) The discharge of material shall consist of suitable material free from toxic pollutants in toxic amounts;

MATERIALS TO BE USED WILL BE MANUFACTURED FROM NON-CONTAMINATED SOURCES.

(xv) All temporary fills shall be removed in their entirety and the area returned to its original elevation.

UNDER PUBLIC WORKS, COMPLIANCE WILL BE ENFORCED BY USE OF FAR CLAUSE 52.223-2 BY THE AUTHORIZED CONTRACT PERSONNEL. UNDER TIMBER SALES, COMPLIANCE WILL BE ENSURED BY ENFORCEMENT OF TIMBER SALE CONTRACT CLAUSES (SUCH AS B6.62 AND C6.62#) BY DESIGNATED TIMBER SALE CONTRACT PERSONNEL. ALL TEMPORARY STRUCTURES (INCLUDING FILLS) TO BE REMOVED AS PART OF SPECIFIED WORK WILL BE ENFORCED FROM SPECIFICATIONS AND PROJECT NOTES CONTAINED AND REFERENCED IN THE CONTRACT.

APPENDIX B – ENGINEERING DESIGN GUIDELINES

Drainage devices are designed and installed in accordance with best management practices and guidelines set forth in FSH 7709.56 Road Pre-construction Handbook and FSH 7709.56b Transportation Structures Handbook. Surface drainage devices include culverts, rolling dips and water diversion structures. Culverts and water diversion structures are generally considered for use on grades steeper than 10%. Culvert size and spacing are in accordance with the above mentioned Handbooks. Water diversion structures are spaced from 150' to 200' apart. Rolling dips are spaced from 200' to 500' apart depending on soil type and road grade and may be plated with rocky material to protect the soil. Outlets of drainage devices provide for dispersion of water to dissipate flow. Catchment basins are of adequate size and location to prevent soil movement off the site. Subsurface drainage devices are in accordance with Handbook references.

Reduce steep (greater than 10%) grades where possible and relocate roads out of bottoms to minimize impact in intermittent draws. Marshy, wet areas are avoided where possible. Rocky fills and geotextiles are used in marshy, wet areas when avoidance is not possible. Highly erodible soils, steep grades and flat areas may be protected by placement of aggregate on the roadbed. Depth of aggregate may vary depending on type of soil but 4" is generally the minimum depth applied to ensure proper bearing strength and soil protection. Where crossings of intermittent drainages, draws and valleys are proposed, 1' to 2' of rocky material may be used to protect the soil. Cut and fill slopes are seeded as soon as possible following completion of road template. Natural revegetation also occurs to supplement specified seeding.

Aggregate surfaced roads shall be routinely maintained. Ditches that have revegetated may be bladed if they are not functioning as designed. Culverts and other drainage devices shall be cleaned of debris to ensure their function is maintained.

Minimize crossings of perennial streams. Consult with Forest hydrologist and fisheries biologist to develop the proper structure required for the stream characteristics, flow volume, soil type and drainage area. Ensure fill slope protection with riprap, gabions, prompt seeding of slopes and/or other methods approved by the hydrologist, fisheries biologist and soil scientist. Placement of the structure shall be in accordance with State and Federal laws regarding construction in and near waterways, including placement of fill and measures to control sedimentation. Routinely maintain bridges and culverts to ensure unrestricted flow. Immediately repair damaged or eroded fill slopes.

Maintain a Streamside Management zone between streams and parallel roads sufficient enough to eliminate movement of soil to the stream. Catchment basins are used where terrain permits. Fill slopes and other disturbed areas are revegetated. Construction equipment would not operate in buffer zones except as necessary to construct fills.

Consider seasonal or annual road and area closures to protect roads. Reference FSH 7709.56, Road Pre-construction Handbook for all design standards. Road Management Objectives, including road standards, maintenance level and travel management, are documented and approved for all roads.

Minimize new construction. New roads are constructed to the minimum standard necessary for the type of use in accordance with FSH 7709.56. New road construction is closed following timber management activity unless documented and approved Road Management Objective states otherwise.

Properly permitted (by Corps of Engineers) discharge of fill or dredged material into waters of the United States would be performed with minimal encroachment of construction equipment outside the fill itself. Minimize disturbance of vegetation in waters of the United States during construction and maintenance of roads. Borrow material needed for road construction would be taken from upland areas. Road construction in non-wetland meadows is in accordance with the Forest Plan (PhaseII, Amendment).

APPENDIX C – ROAD DEFINITIONS AND DESCRIPTIONS

Expected Traffic

Traffic during periods outside intensive timber management activities has been identified. **None ~** Area closed to motorized traffic. Very limited administrative use can be expected.

Low ~ Traffic less than 2 SADT (Seasonal Average Daily Traffic) is expected consisting of Forest Service administrative, permittee and motorized recreation.

Medium ~ 2-20 SADT is expected. These roads access larger areas where higher administrative, permittee and dispersed recreational traffic would occur. These roads also offer access to private or forest developments which would create higher traffic volumes.

High ~ Greater than 20 SADT is expected. These roads provide primary access through the project area or into developed Forest recreation sites.

MAINTENANCE

Maintenance level (ML) ~ Defined in FSH 7709.58, 10, 12. 3 as the level of service provided by, and maintenance required for, a specific road. Maintenance levels must be consistent with road management objectives, and maintenance criteria. Roads may be maintained at one level and planned to be maintained at a different level at some future date. The operational maintenance level is the maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns; in other words, it defines the standard to which the road is currently being maintained. The objective maintenance level is the maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns.

Maintenance level 1 road ~ Defined in FSH 7709.58, 10, 12. 3 as intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns.

Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate." Roads receiving level 1 maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be open and suitable for nonmotorized uses. These roads have the following attributes: (1) vehicular traffic is eliminated, including administrative traffic; (2) physically blocked or entrance is Final Environmental Impact Statement 395 disguised; (3) not subject to the requirements of the Highway Safety Act; (4) maintenance is done only to minimize resource impacts; and (5) no maintenance other than a condition survey may be required so as long as no potential exists for resource damage.

Maintenance level 2 road ~ Defined in FSH 7709.58, 10, 12.3 as roads open for use by high-clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally

minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either (1) discourage or prohibit passenger cars or (2) accept or discourage high-clearance vehicles. These roads have the following attributes: (1) low traffic volume and low speed; (2) typically local roads; (3) typically connect collectors and other local roads; (4) dips are the preferred drainage treatment; (5) not subject to the requirements of the Highway Safety Act; (6) surface smoothness is not a consideration; and (7) not suitable for passenger cars.

Maintenance level 3 road ~ Defined in FSH 7709.58, 10, 12.3 as roads open and maintained for travel by prudent drivers in a standard passenger car. User comfort and convenience are low priorities. Roads in this maintenance level are typically low speed, single lane with turnouts, and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either "encourage" or "accept." "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users. These roads have the following attributes: (1) subject to the requirements of the Highway Safety Act and Manual of Uniform Traffic Control Devices (MUTCD); (2) roads have low to moderate traffic volume; (3) typically connect arterial and collector roads; (4) a combination of dips and culverts provide drainage; (5) may include some dispersed recreation roads; and (6) potholing or washboarding may occur.

Maintenance level 4 road ~ Defined in FSH 7709.58, 10, 12.3 as roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is "encourage." However, the "prohibit" strategy may apply to specific classes of vehicles or users at certain times. These roads have the following attributes: (1) subject to requirements of the Highway Safety Act and MUTCD; (2) roads have moderate traffic volume and speeds; (3) may connect to county roads; (4) culverts provide drainage; (5) usually a collector; and (6) may include some developed recreation roads.

Maintenance level 5 road ~ Defined in FSH 7709.58, 10, 12.3 as roads that provide a high degree of user comfort and convenience. These roads are normally double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is "encourage." These roads have the following attributes: (1) subject to the requirements of the Highway Safety Act and MUTCD; (2) highest traffic volume and speeds; (3) typically connect State and county roads; (4) culverts provide drainage; (5) usually arterial and collector; (6) may include some developed recreation roads; and (7) usually paved or chip-sealed.

Mixed-use road ~ Segments of National Forest System roads that are identified and signed as open to state licensed and unlicensed vehicles; generally more than 50 inches in width and usually, but not always, low maintenance roads with no high-speed traffic.

Motor vehicle ~ Any vehicle which is self-propelled, other than: (a) a vehicle operated on rails; and (b) any wheelchair or mobility device, including one that is battery-powered, that is designed solely for use Black Hills National Forest Travel Management Plan 396

by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area (36 CFR 212.1).

Motor vehicle use map (MVUM) ~ A map reflecting designated roads, trails, and areas on an administrative unit or a ranger district of the National Forest System (36 CFR 212.1).

Motorized mixed use ~ Designation of a National Forest System road for use by both highway-legal and non-highway legal motor vehicles (FSM 7700).

Motorized trail ~ A travelway usually, but not always, less than 50 inches in width usually, but not always, available for use by all-terrain vehicles (ATVs) and/or motorcycles. These travelways may also be made available to high-clearance four-wheel drive vehicles, and may also be used by bicycles, horses, and hikers.

ROAD TYPES

National Forest System road ~ A forest road other than a road which has been authorized by a legally documented right-of-way held by a state, county, or local public road authority (36 CFR 212.1).

Unauthorized road or trail ~ A road or trail that is not a forest road or trail or a temporary road or trail and that is not included in a forest transportation atlas (36 CFR 212.1).

Unauthorized route ~ Could refer to either an unauthorized road or unauthorized trail, or (plural) both.

ROAD CLASSIFICATION

Arterial road ~ A National Forest System road that provides service to large land areas and usually connects with other arterial roads or public highways.

Collector road ~ A National Forest System road that services smaller areas than an arterial road and that usually connects arterial roads to local roads or terminal facilities. **Local road ~** A

National Forest System road that connects a terminal facility with collector roads, arterial roads, or public highways and that usually serves a single purpose involving intermittent use.

Road Management Objectives (RMO) ~ RMOs document the intended purpose of an individual road in providing access to implement a land and resource management plan as well as decisions about applicable standards for the road. RMOs should be based on management area direction and access management objectives. RMOs contain design criteria, operation criteria, and maintenance criteria. (FSM 7709.59.11)

Traffic Service Level ~ Describes the significant traffic characteristics and operating conditions of a road. (FSM 7705, FSH 7709.56, Chapter 4)

Level G ~ Provides service for mixed traffic types offering passing room on the road. Safety is a prime concern with serious hazards identified to users. User costs are also a predominant consideration. Design limitations from topography is a factor which may reduce design speeds. A smooth and stable surface is provided. Oversize vehicular traffic would be regulated by permit.

Level H ~ Provides service for mixed traffic. Congestion of traffic is anticipated. Topography is the predominate design factor. Safety considerations are incorporated into designs. Vehicle types may be managed to limit traffic. A stable surface shall be provided for the predominant traffic type.

Level I ~ Provides service for erratic volumes of traffic with limited user comfort and efficiency. Location is generally dictated by topography. Difficulty in negotiating these roads is anticipated for some vehicle types. Traffic controls may be implemented frequently. Some rutting and an irregular road surface may be present.

Level J ~ Provides limited service to traffic. Intermittent and controlled use is anticipated. Some vehicles may not be able to negotiate the facility. Minimum safety features would be incorporated into designs. Topography would dictate location. A rough and irregular surface is expected. The primary purpose of these roads is for a single resource use.

Traffic Management Strategies ~ Options for managing traffic on NFS roads where appropriate to control traffic. Use one or a combination of the following five strategies for different modes of travel:

Encourage use ~ Encourage use consistent with the condition of the road and its Road Management Objectives (FSH 7709.59).

Accept use ~ Accept, but do not encourage, use by vehicles that are suitable for the road.

Discourage use ~ Discourage some or all types of motor vehicle use.

Eliminate use ~ Eliminate use by blocking access to the road by motor vehicles.

Prohibit use ~ Prohibit motor vehicle use. (FSM 7731.11)

Decommission ~ Demolition, dismantling, removal, obliteration and/or disposal of a deteriorated or otherwise unneeded asset or component, including necessary cleanup work. This action eliminates the deferred maintenance needs for the fixed asset. Portions of an asset or component may remain if they do not cause problems nor require maintenance. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)

Road decommissioning ~ Activities that result in restoration of unneeded roads to a more natural state (FSM 7734). Decommissioning includes applying various treatments, which may include one or more of the following:

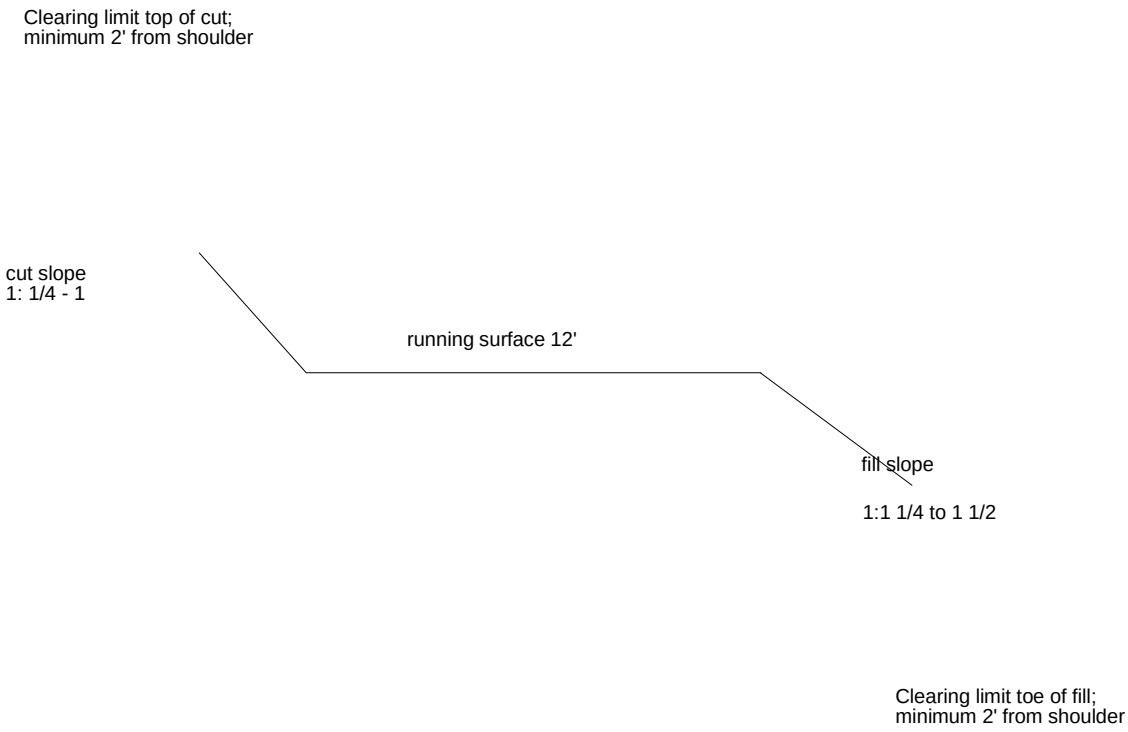
a. Reestablishing former drainage patterns, stablizing slopes, and restoring vegetation;
b. Blocking the entrance to a road; installing water bars;
c. Removing culverts, reestablishing drainage-ways, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed;
d. Completely eliminating the roadbed by restoring natural contours and slopes; or
e. Other methods designed to meet the specific conditions associated with the unneeded roads.

ROAD STANDARDS

Road standards were determined by anticipated traffic, maintenance and traffic management implementation. Aggregate surfacing would be utilized on road sections to protect soils and provide a more stable surface on roads serving large areas of the Forest. Figures 9 through 12 show typical road profiles for maintenance level 1, 2, 3, & 4 roads.

FIGURE 9 – ROAD STANDARD 1

These are minimum standard timber access roads. Season of use would be curtailed due to soil stability and drainage problems, which are expected seasonally. Generally used on short (less than 1/2 mile) roads or roads with traffic restrictions or where timber haul is expected to be less than 1.0 MMBF per entry.

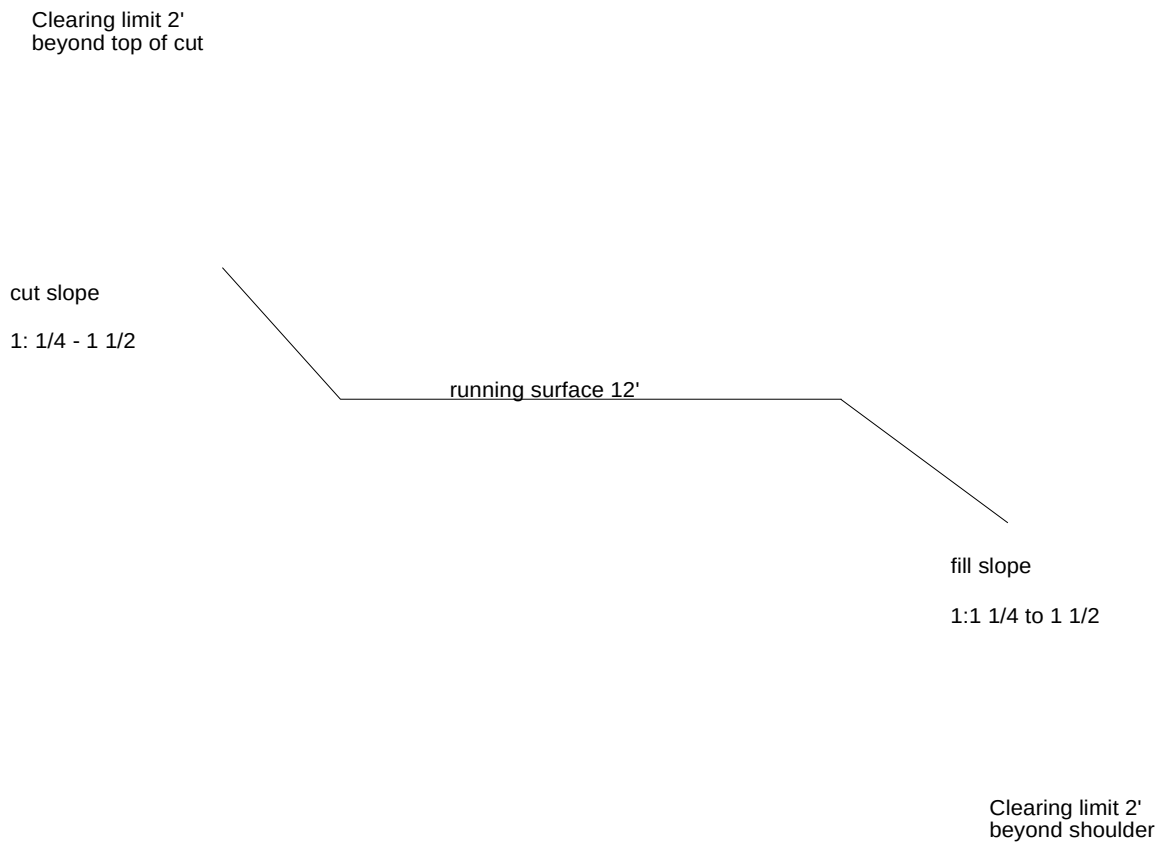


FEATURES:

- Surface: native
- Turnouts: none
- Grades: sustained 10%; pitches 500' to 16%
- Curve widening: 400/R, maximum 4'
- Curve radius: 50'
- Drainage: rolling dips, low water crossings, metal pipes

FIGURE 10 – ROAD STANDARD 2

Timber access road where soil stability problems are anticipated with expected timber volumes. Road may or may not have travel restrictions. Used for roads expected to carry 0.5-1.5 MMBF/entry.

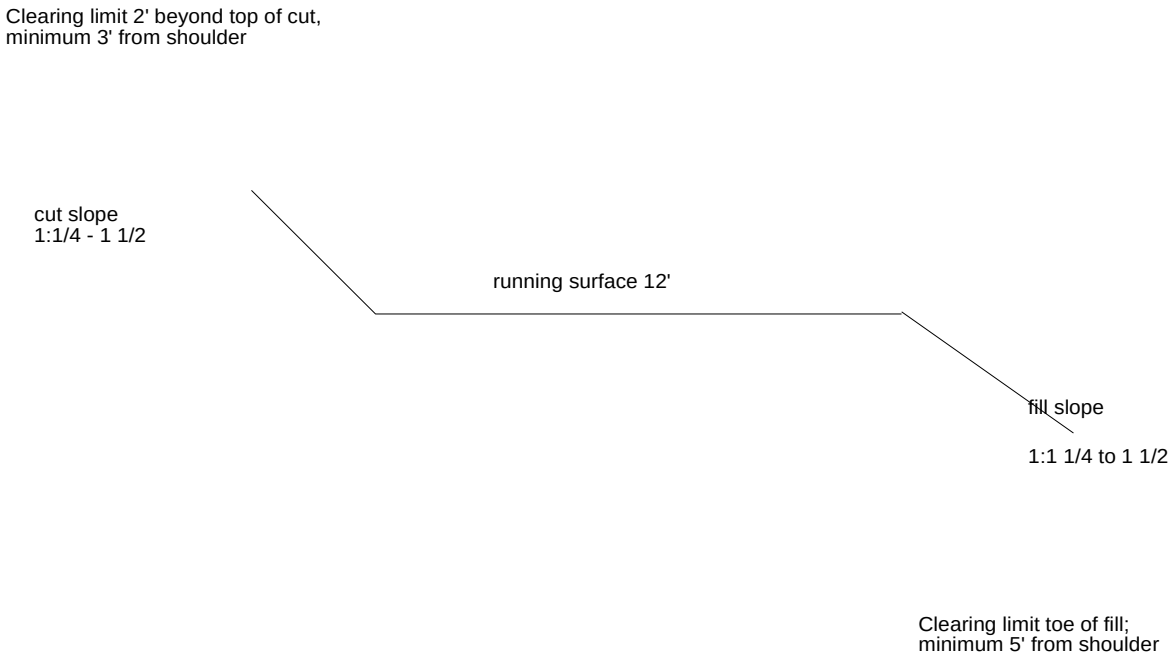


FEATURES:

- Surface: native, spot surfacing in deep unstable soils
- Turnouts: at critical safety features (crests of grades)
- Grades: sustained 10%, pitches 400' to 16%
- Curve widening: 400/R
- Curve radius: 50'
- Drainage: rolling dips, low water crossings, metal pipes

FIGURE 11 –ROAD STANDARD 3

This level of road standard is applied to roads where extensive timber haul is expected and where use may be important to maintaining logging continuity in the area or recreation roads where timber traffic is strictly regulated. Added safety features are needed for potential conflicts with mixed traffic.

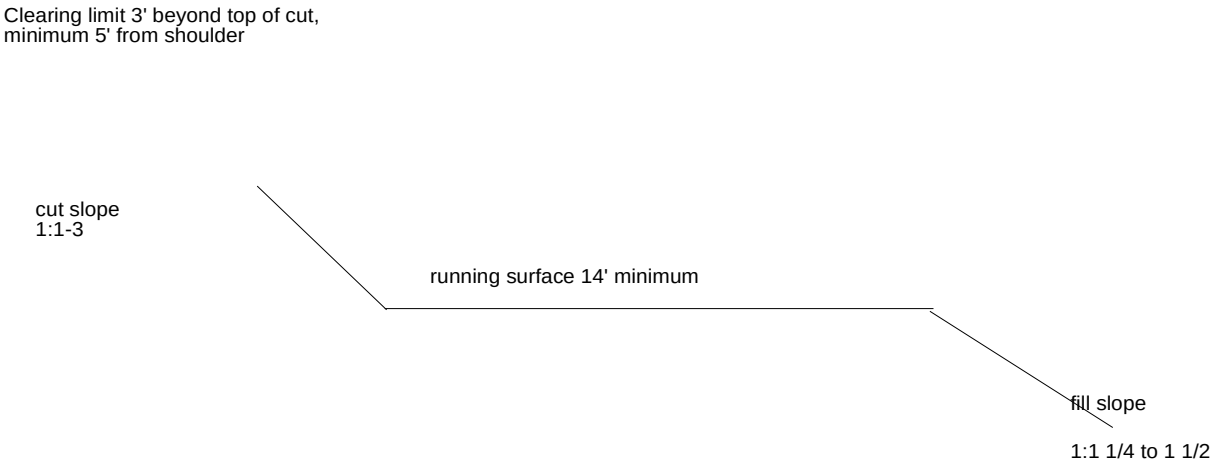


FEATURES:

- Surface: aggregate where timber haul exceeds 3 MMBF reinforce deep unstable soils aggregate for user comfort of recreation access
- Turnouts: 1500' maximum spacing
- Grades: sustained 8%, pitches 400' to 15%
- Curve widening: 400/R
- Curve radius: 75'
- Drainage: rolling dips, low water crossings, metal pipes

FIGURE 12 – ROAD STANDARD 4

Level 4 roads are those with high or medium traffic levels expected and user safety and comfort are the primary concerns.



needs would be considered.

FEATURES:

- Surface: aggregate or asphalt
- Turnouts: inter-visible
- Grades: sustained 8%, pitches to 300 feet 12%
- Curve widening: 800/R
- Curve radius: minimum 100 feet
- Drainage: metal or concrete pipe or bridges

- Level 5 roads meet the Standard of roads under the State of Wyoming or local county jurisdiction. Reconstruction activities would be evaluated as proposals are received from these agencies. Anticipated traffic, safety and land management